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PSAPCA REG 11656
Revision FINAL
Date:June 3, 1995

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

BALL GLASS CONTAINER CORP.

580 EAST MARGINAL WAY SOUTH

SEATTLE, WA 98134

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BALL GLASS CONTAINER CORPORATION

Applicant (Facility Location)

- Ball Glass Container Corp.
  5801 E. Marginal Way
  Seattle, WA 98134-2497

Owner

- Ball Glass Container Corp.
  1509 S. Macedonia Ave.
  Muncie, IN 47302-3664

- PSAPCA Registration No. 11656

- Facility SIC Code 3221

- Responsible Officials

Facility Rep. Frank W. Glinka
Plant Manager
206-767-0660

FAX 206-767-7311

Owner Rep. Gordon E. Hughes
V.P. Engineering
317-741-7107

FAX 317-741-7110

- Contact for questions about application

  John R. Mino
  Senior Environmental Engineer
  1509 S. Macedonia Ave.
  Muncie, IN 47302-3664
  317-741-7116

  FAX 317-741-7110

- Operating permit fees

  This permit is valid for a period of 5 years and will expire June 7, 2000 subject to annual payment of Operating Fees as required by Federal, Washington State and PSAPCA requirements listed at 40CFR-10-9(a); WAC 173-401-100; and Regulation I Article 507(b)(4) respectively. Annual Fees and due dates are listed as follows:

1995	$12,258.21	June 7, 1995
1996		
1997		
1998		
1999		
2000		

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Description of The Glass Container Manufacturing Process

The major glass-making raw materials, consisting of sand, soda ash and limestone, along with lesser quantities of colorants and refining agents, are received by rail or truck and unloaded into storage silos until needed. Recycled glass, called cullet, from both our own process (rejects) and purchased from recycling centers, and other outside sources is also a major raw material. These batch materials, in carefully weighed proportions, are thoroughly mixed and conveyed to storage bins located near the glass melting furnace above specially designed feeders from which mixed batch is continuously fed into one end of the furnace. This furnace, which is essentially a refractory box constructed of high-temperature resistant refractories, contains the batch mix now in a molten state, at temperatures in excess of 2500°F.

In a "cold top" all electric furnace (Seattle Furnace #1), the energy input for melting and refining the glass is supplied by resistance electric heating through electrodes immersed in the glass. From an environmental perspective, there are no reported emissions from this type of electric furnace. In this furnace melter, a batch cover is maintained over the surface of the glass in order to retain any heat loss from the glass. The cover also eliminates or minimizes any particulate matter from escaping into the atmosphere while retaining the volatiles from the melting raw materials.

Regardless of whether the energy is supplied from fossil fuels, or resistance electric heating, chemical reactions occur at high temperatures over a period of several hours to form glass. The refining process (removal of trapped gases and bubbles) and homogenization of the glass takes place both during and after melting. Nearly bubble-free glass is continuously withdrawn from the other end of the furnace and flows through shallow refractory channels called forehearths to the forming machines where bottles and jars are made. Following the forming process, the containers are heat-treated and annealed (removal of unwanted stress areas in the glass) in an oven called a lehr. The containers are then inspected, packed and shipped to our customers. This process normally operates 24 hours a day, 7 days a week.

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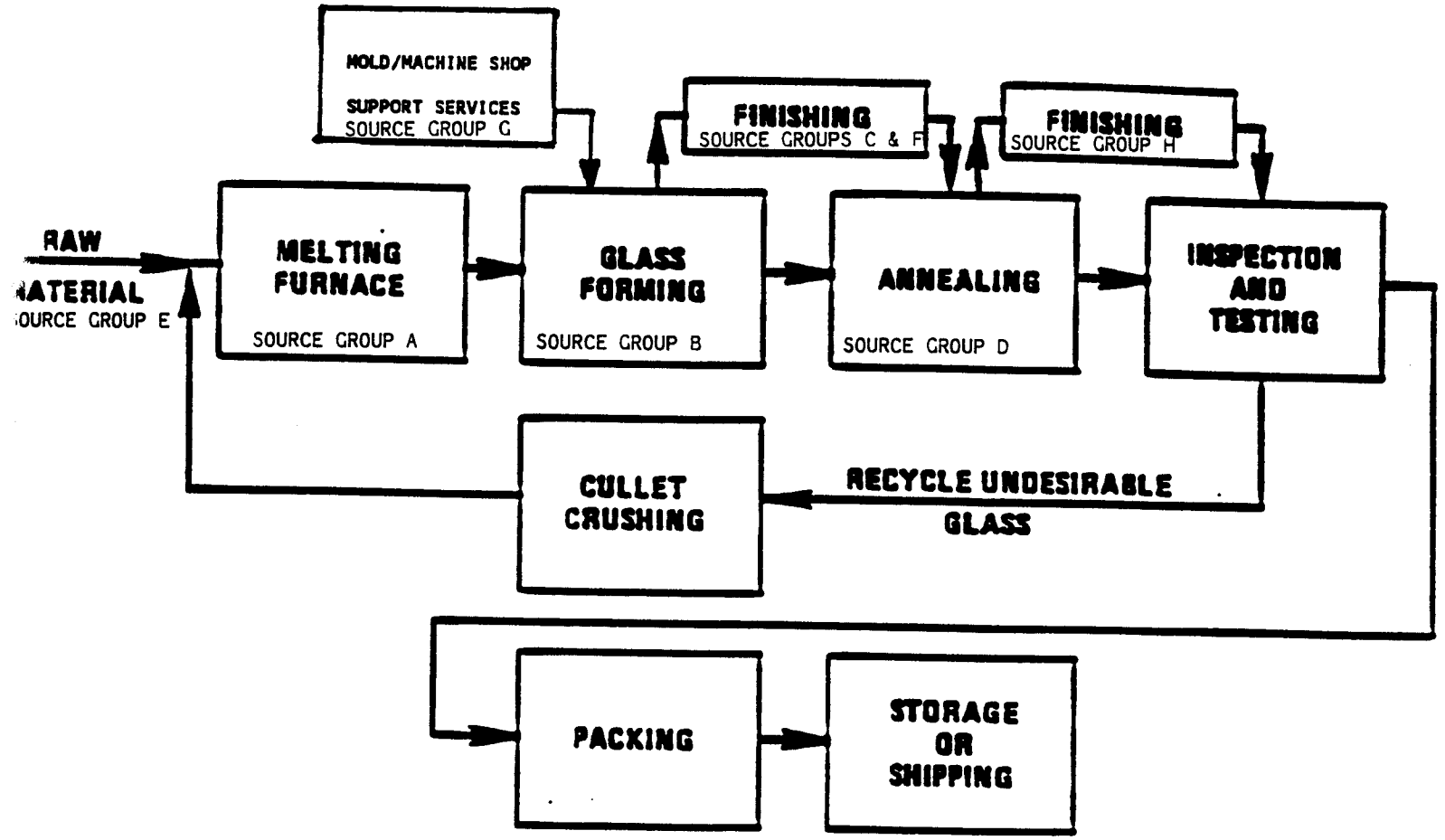

Typical glass manufacturing process.

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FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

APPLICABLE REQUIREMENTS

GENERALLY APPLICABLE TO ALL EMISSION UNITS

APPLICABLE REQUIREMENTS TABLE
REGULATIONS GENERALLY APPLICABLE TO ALL EMISSIONS UNITS

Regulated Pollutant	Regulatory Limits		Compliance Demonstration Method (e.g., source test, monitor, record)	Enforceability
	Regulation ID	Allowable Limit or Requirement		
General	PSAPCA Reg. I, Sect. 3.07(a)-(c)	Compliance tests to be performed in accordance with EPA or Board approved methods. Written notification to Agency two weeks prior to compliance test. Submittal of report containing results no later than 60 days after completion of source test.	Source test, notification and report	Federal
General	PSAPCA Reg. I, Sect. 5.07(b)	Registration or operating permit fees due and payable within 30 days of assessment by Agency. Fees not fully paid within 90 days will be deemed delinquent.	Fee payment	Federal
General	PSAPCA Reg. I, Sect. 9.11 WAC 173-400-040(5)	Causing or allowing emissions of any air contaminant in sufficient quantities and of such characteristics and duration as is, or is likely to be, injurious to human health, plant or animal life, or property, or which unreasonably interferes with enjoyment of life and property is unlawful.	Reasonable precautions to prevent PM emission, including implementation of O&M plan.	Federal

Regulated Pollutant	Regulatory Limits		Compliance Demonstration Method (e.g., source test, monitor, record)	Enforceability
	Regulation ID	Allowable Limit or Requirement		
General	PSAPCA Reg. I, Sect. 9.12 WAC 173-400-040(4)	Causing or allowing emissions of odor-bearing air contaminant unless BACT is used is unlawful.	Reasonable precautions to prevent odor-bearing emissions, including implementation of O&M plan.	State only
General	PSAPCA Reg. I, Sect. 9.13 WAC 173-400-040(7)	Concealment and masking emission of air contaminants is unlawful.	Equipment inspection	Federal
PM	PSAPCA Reg. I, Sect. 9.15(a)-(d) WAC 173-400-040(8)	Fugitive dust emission standards, including use of BACT to control emissions.	Reasonable precautions to prevent emissions of fugitive dust, including implementation of O&M plan.	Federal
General	PSAPCA Reg. I, Sect. 9.20	Equipment and control devices must be maintained in good working order.	Implementation of O&M plan.	Federal
PM	PSAPCA Reg. I, Sect. 9.04 WAC 173-400-040(2)	Causing or allowing PM emissions which become deposited upon the property of others in sufficient quantities and of such characteristics and duration as is, or is likely to be, injurious to human health, plant or animal life, or property, or which unreasonably interferes with enjoyment of life and property is unlawful.	Reasonable precautions to prevent PM emission, including implementation of O&M plan	Federal

Regulated Pollutant	Regulatory Limits		Compliance Demonstration Method (e.g., source test, monitor, record)	Enforceability
	Regulation ID	Allowable Limit or Requirement		
TAC	PSAPCA Reg. III, Sect. 1.11(b)	Report concerning types and amounts of toxic air contaminants (TACs) emitted and other relevant information needed to calculate such emissions to Agency.	Report	Federal
General	WAC 173-400-105(1)	Annual Inventory	Records	Federal
General	WAC 173-400-107	Report Excess Emissions	Report	State only

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Emission Source Group A - Glass Melting Furnaces

- **Furnace #1** Plot Plan ID #1 Furnace
  Description: All electric glass melter including batch feeders, melter and refiner, feeding two (2) 36" wide fuel fired forehearths

  Notice of Construction No. N/A

  Compliance Monitoring: N/A No Significant Emissions

- **Furnace #2** Plot Plan ID #2 Furnace
  Description: Oxy-fuel glass melter including batch feeders, melter and refiner, feeding two (2) 36" wide fuel fired forehearths.

  Notice of Construction No. 5289

- **Furnace #3** Plot Plan ID #3 Furnace

  Description: Oxy-fuel glass melter including batch feeders, melter and refiner, feeding two (2) 36" wide fuel fired forehearths

  Notice of Construction No. 4546

- **Furnace #4** Plot Plan ID #4 Furnace

  Description: Regenerative end port furnace including batch feeders, melter and refiner, feeding two (2) 36" wide fuel fired forehearths

  Notice of Construction No. N/A

- **Furnace #5** Plot Plan ID #5 Furnace

  Description: Oxy-fuel glass melter including batch feeders, melter and refiner feeding two (2) 36" wide fuel fired forehearths

  Notice of Construction No. 5193

Applicable Requirements: See summary listing identified as Group A, Furnace Operations

Inapplicable Requirements: See Appendix A identified as Inapplicable Regulations

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

EMISSION INFORMATION

Glass Melting Furnaces

Specific limitations (Federally enforceable)

	PM10	NO_x	SO_2	Opacity	PM10 1-hour Ave. Emissions
Furnace #1	N/A	N/A	N/A	N/A	N/A
Furnace #2	3 lbs/hr	3.8 lbs/ton	1.6 lbs/ton	<20%/3 min	0.5 lbs/T
Furnace #3	7 lbs/hr	N/A	N/A	<20%/3 min	N/A
Furnace #4	4.7 lbs/hr	N/A	N/A	<20%/3 min	N/A
Furnace #5	2.8 lbs/hr	3.8 lbs/ton	1.6 lbs/ton	<20%/3 min	0.5 lbs/T

Calculations: Annual emissions are calculated using the total tons of glass produced for each furnace times a calculated emission factor. These current emission factors are based on actual source tests conducted May 17-20, 1994.

	PM10	NO_x	SO_2
Furnace #1	N/A	N/A	N/A
Furnace #2	0.44	0.97	0.99
Furnace #3	0.58	0.76	0.67
Furnace #4	0.85	14.49	0.74
Furnace #5	0.46	0.75	1.48

In Compliance: (yes) no

Annual Requirements:

Source test measuring PM10, NO_x, SO_2 and CO following EPA methods 201A, 7E, 6C and 10 respectively.

Daily Monitoring: CEM for opacity on Furnaces #2, #3, #4, #5. All monitors certified to meet EPA specifications listed at 40CFR60 Appendix 8. Corresponding production data of tons of glass produced is recorded daily.

APPLICABLE REGULATIONS AND COMPLIANCE DEMONSTRATION SUMMARY
REGULATIONS: GROUP A, FURNACE OPERATIONS

Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Notice of Construction Special Conditions or Regulation ID	Allowable Limit or Requirement			
PM_{10}	N.O.C. #5256 (5)	PM_{10} emissions from glass furnace # 2 ≤ 3 lb/hr	Annual Source Test	Method 5 or EPA Method 201A/202	Federal
PM_{10}	N.O.C. #5256 (6)	PM_{10} emissions from glass furnace # 3 ≤ 7 lb/hr	Annual Source Test	Method 5 or EPA Method 201A/202	Federal
PM_{10}	N.O.C. #5256 (7)	PM_{10} emissions from glass furnace # 4 ≤ 4.7 lb/hr	Annual Source Test	Method 5 or EPA Method 201A/202	Federal
PM_{10}	N.O.C. #5256 (8)	PM_{10} emissions from glass furnace # 5 ≤ 2.8 lb/hr	Annual Source Test	Method 5 or EPA Method 201A/202	Federal
PM_{10}	N.O.C. #5289(5)(a)	Emissions limit for glass furnace #2: 0.5 lbs PM_{10}/ton of glass produced (1-hour average)	Annual Source Test	Method 5 or EPA Method 201A/202	Federal

Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Notice of Construction Special Conditions or Regulation ID	Allowable Limit or Requirement			
PM_{10}	N.O.C. #5193(5)(a)	Emissions limit for glass furnace #5: 0.5 lbs PM_{10}/ton of glass produced (1-hour average)	Annual Source Test	Method 5 or EPA Method 201A/202	Federal
PM_{10}	PSAPCA Reg.I, §9.09(a)	Maximum PM emissions standard for fuel burning equipment: 0.05 grains/dscf (0.115 g/dcm)	As negotiated with PSAPCA, Continuous Emissions Monitoring System (CEMS) is used in lieu of the requirements under this regulation.		Federal
PM_{10}	WAC 173-400-050	PM emissions limit for combustion units not burning wood-derived fuel: 0.23 g/m^3 (0.1 grains/dscf)	Compliance with PSAPCA Reg.I, §9.09(a) demonstrates compliance with this regulation.		Federal
PM_{10}	WAC 173-400-040(3)(a)	Requires owner or operator of a source of fugitive emissions to take reasonable precautions to prevent the release of air contaminants from the operation	Reasonable precautions to prevent PM emission	None	Federal

Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Notice of Construction Special Conditions or Regulation ID	Allowable Limit or Requirement			
NO_x	N.O.C. #5289(5)(b)	Emissions limit for glass furnace #2: 3.8 lbs NO_x/ton of glass produced (1-hour average)	Compliance established by source test on 5/17/94	Additinal test as required by PSAPCA	Federal
NO_x	N.O.C. #5193(5)(b)	Emissions limit for glass furnace #5: 3.8 lbs NO_x/ton of glass produced (1-hour average)	Compliance established by source test on 5/17/94	Additinal test as required by PSAPCA	Federal
SO_2	N.O.C. #5289(5)(c)	Emissions limit for glass furnace #2: 1.6 lbs SO_2/ton of glass produced (1-hour average)	Compliance established by source test on 5/17/94	Additinal test as required by PSAPCA	Federal
SO_2	N.O.C. #5193(5)(c)	Emissions limit for glass furnace #5: 1.6 lbs SO_2/ton of glass produced (1-hour average)	Compliance established by source test on 5/17/94	Additinal test as required by PSAPCA	Federal
SO_2	PSAPCA Reg.I, §9.07 WAC 173-400-040(6)	Maximum SO_2 emission limit: 1000 ppm hourly average, dry basis, corrected to 7% O_2 for combustion sources	Compliance established by source test on 5/17/94	Additinal test as required by PSAPCA	Federal

Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Notice of Construction Special Conditions or Regulation ID	Allowable Limit or Requirement			
Opacity	PSAPCA Reg. I, §9.03	Emission of Air Contaminants: Visual Standard--unlawful to emit any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour which is greater than 20% opacity	CEMS	Measured exceedance will trigger alarm to furnace operator for immediate action	Federal
Opacity	PSAPCA Reg. I, §9.09(b)(1) WAC 173-400-040 (1)	Emissions cannot exceed 20% opacity for more than three total minutes in any one hour .	CEMS	Measured exceedance will trigger alarm to furnace operator for immediate action	Federal
Opacity	PSAPCA Reg. I, §9.09(d)	Inapplicability of 5% 1-hour average opacity limit (PSAPCA Reg. I, §9.09(b)(2)) to glass furnaces that test annually for compliance with §9.09(a)	N/A	N/A	Federal
Opacity	PSAPCA Reg. I, §12.02(a)	Requirement of CEMS for glass furnaces rated at greater than 1 ton of glass per hour burning fuel	Daily Furnace Fuel Report	None	Federal

Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Notice of Construction Special Conditions or Regulation ID	Allowable Limit or Requirement			
Opacity	PSAPCA Reg. I, §12.02(c)	Unlawful for any person to cause or allow operation of any equipment which is required to use CEM through an Order of Approval without the continuous monitoring of the emissions or operations in accordance with PSAPCA Reg. I, §12.03 and 12.04.	CEMS	Monthly Report	Federal
Opacity	PSAPCA Reg. I, §12.03(a)	Requires that all continuous monitors meet the performance specifications in 40CFR Part 60, Appendix B	Established by CEMS certification	As noted in Appendix B	Federal
Opacity	PSAPCA Reg. I, §12.03(f)	Requires that all continuous opacity monitors be maintained in accordance with EPA "Recommended Quality Assurance Procedures for Opacity Continuous Emission Monitoring Systems" (EPA 340/186-010)	Quarterly and annual RATA certification	As specified in requirement	Federal
Opacity	PSAPCA Reg. I, §12.03(h)	Specifies grounds for invalidating CEMs data. CEMs data is considered invalid under any of the following conditions: 1) Operation of the monitor out of compliance with PSAPCA Reg. I, §12.03(a-g). 2) Monitor is being zeroed, spanned, or otherwise inoperative. 3) An hour contains less than 75% valid data readings. 4) A day contains less than 90% valid hours when the source is in operation.	CEMS	Monthly Report	Federal

Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Notice of Construction Special Conditions or Regulation ID	Allowable Limit or Requirement			
Opacity	PSAPCA Reg. I, §12.04(a)	Requires that valid monitoring data for opacity be reduced to 1-minute averages on a clock basis.	CEMS	Monthly Report	Federal
Opacity	PSAPCA Reg. I, §12.04(e)	Requires that a chronological file be maintained which includes: all measurements; data-reduction results required in §12.04(a); the cause, time, period, and magnitude of all emissions or operations which violate the applicable standards; the cause and time periods of any invalid data averages; all performance test and recalibration data; record of repairs, maintenance, and adjustment; and any data necessary for conversion of the results to units consistent with the applicable emissions standards. Data must be kept for two years after it is recorded.	CEMS	Monthly Report	Federal

Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Notice of Construction Special Conditions or Regulation ID	Allowable Limit or Requirement			
Opacity	PSAPCA Reg. I, §12.04(f)	Requires that a monthly report be issued to the Control Officer within 30 days after the end of each month, containing: the cause, time, period, and magnitude of all emissions or operations which violate the applicable standards and any corrective action taken; the cause and time periods for any invalid hours; the results of all performance tests and recalibrations conducted during the month; the amount of fuel burned or the process weight charged to the equipment per day; and any other additional information requested by the Agency.	CEMS	Monthly Report	Federal

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
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Emission Source Group B - Glass Forming Machines (10)

Description: Glass containers are formed from molten glass in metal moulds on I.S. machines. Each mould on a machine requires periodic lubrication to prevent the hot glass from sticking or hanging up as the glass enters or leaves the mould. The mould release agent is applied on the hot glass contact areas or cavities of the mould and forms a lubricant film between the metal of the mould and the hot glass. These lubricants are composed of petroleum hydrocarbons, graphite and sulfur. The lubricants have extremely low vapor pressures and high vapor densities (>8). The volatiles are essentially 0% by weight.

Applicable Requirements: See summary listing identified as Group B, Forming Machines

Specific Limitations: None

In Compliance: (yes) no

Annual Requirements:

Record quantity of mold swabbing compounds used for the year (by type of compound). Record operating hours for the facility.

Calculations:

Kleen mold compound # ___ x % Hydrocarbons = ____ lbs.

Total Annual Emissions

= Σ of all Kleen mold compounds x 1 ton/2000 lbs = ___ tons

APPLICABLE REGULATIONS AND COMPLIANCE DEMONSTRATION SUMMARY
REGULATIONS: GROUP B, FORMING MACHINES

Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Regulation ID	Allowable Limit or Requirement			
PM_{10}	WAC 173-400-040(3)(a)	Requires owner or operator of a source of fugitive emissions to take reasonable precautions to prevent the release of air contaminants from the operation	Reasonable precautions to prevent PM emission	None	Federal
Opacity	PSAPCA Reg. I, §9.03	Emission of Air Contaminants: Visual Standard--unlawful to emit any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour which is greater than 20% opacity	Reasonable precautions to prevent excess PM emissions	None	Federal
Opacity	WAC 173-400-040 (1)	Emissions cannot exceed 20% opacity for more than three total minutes in any one hour .	Reasonable precautions to prevent excess PM emissions	None	Federal

11.15 Glass Manufacturing

11.15.1 General[1-5]

Commercially produced glass can be classified as soda-lime, lead, fused silica, borosilicate, or 96 percent silica. Soda-lime glass, since it constitutes 77 percent of total glass production, is discussed here. Soda-lime glass consists of sand, limestone, soda ash, and cullet (broken glass). The manufacture of such glass is in four phases: (1) preparation of raw material, (2) melting in a furnace, (3) forming and (4) finishing. Figure 11.15-1 is a diagram for typical glass manufacturing.

The products of this industry are flat glass, container glass, and pressed and blown glass. The procedures for manufacturing glass are the same for all products except forming and finishing. Container glass and pressed and blown glass, 51 and 25 percent respectively of total soda-lime glass production, use pressing, blowing or pressing and blowing to form the desired product. Flat glass, which is the remainder, is formed by float, drawing, or rolling processes.

As the sand, limestone, and soda ash raw materials are received, they are crushed and stored in separate elevated bins. These materials are then transferred through a gravity feed system to a weigher and mixer, where the material is mixed with cullet to ensure homogeneous melting. The mixture is conveyed to a batch storage bin where it is held until dropped into the feeder to the melting furnace. All equipment used in handling and preparing the raw material is housed separately from the furnace and is usually referred to as the batch plant. Figure 11.15-2 is a flow diagram of a typical batch plant.

The furnace most commonly used is a continuous regenerative furnace capable of producing between 45 and 272 megagrams (Mg) (50 and 300 tons) of glass per day. A furnace may have either side or end ports that connect brick checkers to the inside of the melter. The purpose of brick checkers (Figure 11.15-3 and Figure 11.15-4) is to conserve fuel by collecting furnace exhaust gas heat that, when the air flow is reversed, is used to preheat the furnace combustion air. As material enters the melting furnace through the feeder, it floats on the top of the molten glass already in the furnace. As it melts, it passes to the front of the melter and eventually flows through a throat leading to the refiner. In the refiner, the molten glass is heat conditioned for delivery to the forming process. Figures 11.15-3 and 11.15-4 show side port and end port regenerative furnaces.

After refining, the molten glass leaves the furnace through forehearths (except in the float process, with molten glass moving directly to the tin bath) and goes to be shaped by pressing, blowing, pressing and blowing, drawing, rolling, or floating to produce the desired product. Pressing and blowing are performed mechanically, using blank molds and glass cut into sections (gobs) by a set of shears. In the drawing process, molten glass is drawn upward in a sheet through rollers, with thickness of the sheet determined by the speed of the draw and the configuration of the draw bar. The rolling process is similar to the drawing process except that the glass is drawn horizontally on plain or patterned rollers and, for plate glass, requires grinding and polishing. The float process is different, having a molten tin bath over which the glass is drawn and formed into a finely finished surface requiring no grinding or polishing. The end product undergoes finishing (decorating or coating) and annealing (removing unwanted stress areas in the glass) as required, and is then inspected and prepared for shipment to market. Any damaged or undesirable glass is transferred back to the batch plant to be used as cullet.

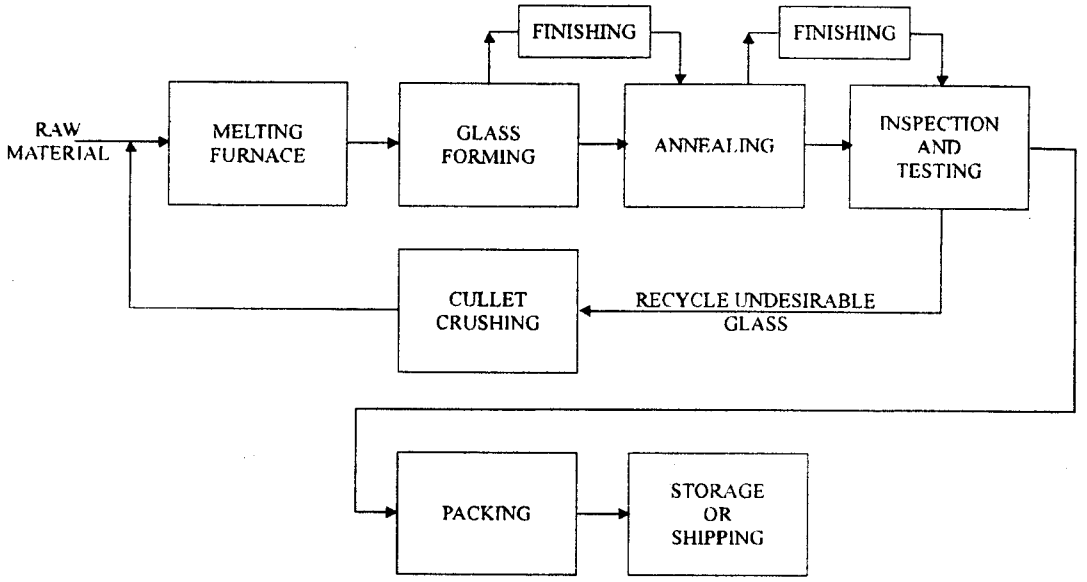

Figure 11.15-1. Typical glass manufacturing process.

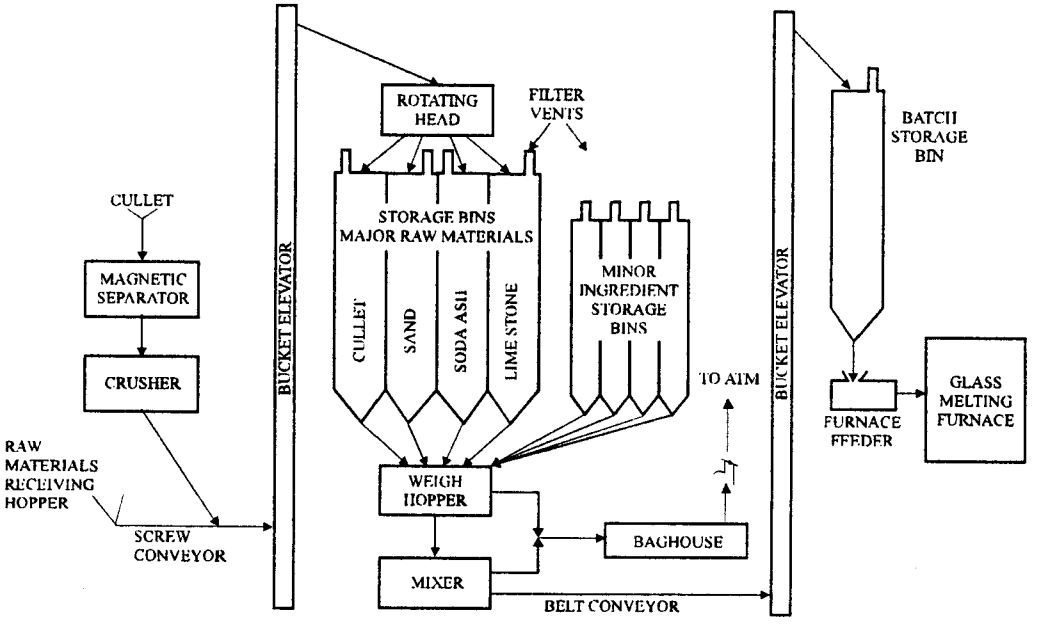

Figure 11.15-2. General diagram of a batch plant.

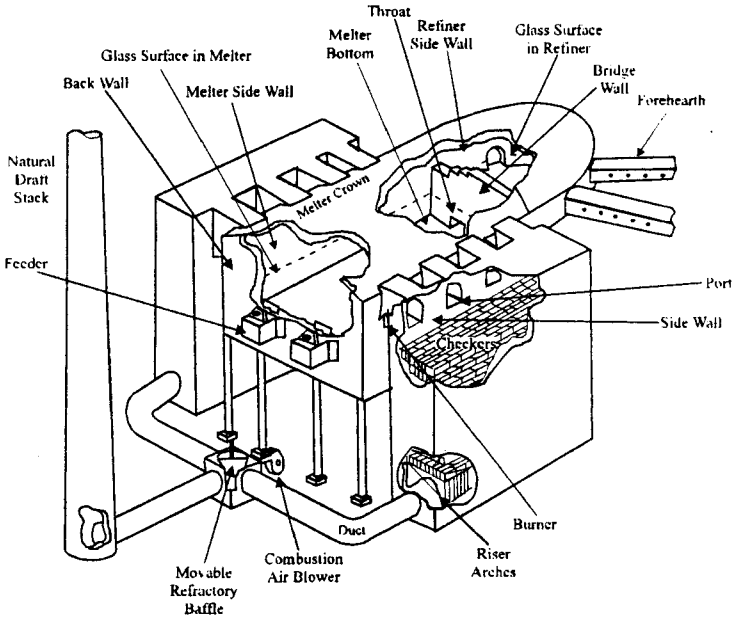

Figure 11.15-3. Side port continuous regenerative furnace.

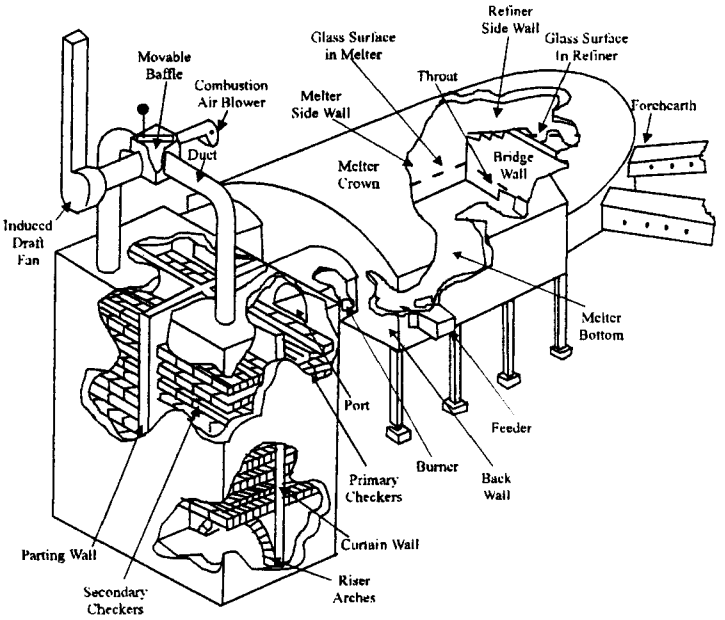

Figure 11.15-4. End port continuous regenerative furnace.

11.15.2 Emissions And Controls[1-5]

The main pollutant emitted by the batch plant is particulates in the form of dust. This can be controlled with 99 to 100 percent efficiency by enclosing all possible dust sources and using baghouses or cloth filters. Another way to control dust emissions, also with an efficiency approaching 100 percent, is to treat the batch to reduce the amount of fine particles present, by presintering, briquetting, pelletizing, or liquid alkali treatment.

The melting furnace contributes over 99 percent of the total emissions from a glass plant, both particulates and gaseous pollutants. Particulates result from volatilization of materials in the melt that combine with gases and form condensates. These either are collected in the checker work and gas passages or are emitted to the atmosphere. Serious problems arise when the checkers are not properly cleaned in that slag can form, clog the passages, and eventually deteriorate the condition and efficiency of the furnace. Nitrogen oxides form when nitrogen and oxygen react in the high temperatures of the furnace. Sulfur oxides result from the decomposition of the sulfates in the batch and sulfur in the fuel. Proper maintenance and firing of the furnace can control emissions and also add to the efficiency of the furnace and reduce operational costs. Low-pressure wet centrifugal scrubbers have been used to control particulate and sulfur oxides, but their inefficiency (approximately 50 percent) indicates their inability to collect particulates of submicrometer size. High-energy venturi scrubbers are approximately 95 percent effective in reducing particulate and sulfur oxide emissions. Their effect on nitrogen oxide emissions is unknown. Baghouses, with up to 99 percent particulate collection efficiency, have been used on small regenerative furnaces, but fabric corrosion requires careful temperature control. Electrostatic precipitators have an efficiency of up to 99 percent in the collection of particulates. Tables 11.15-1 and 11.15-2 list controlled and uncontrolled emission factors for glass manufacturing. Table 11.15-3 presents particle size distributions and corresponding emission factors for uncontrolled and controlled glass melting furnaces, and these are depicted in Figure 11.15-5.

Emissions from the forming and finishing phases depend upon the type of glass being manufactured. For container, press, and blow machines, the majority of emissions results from the gob coming into contact with the machine lubricant. Emissions, in the form of a dense white cloud that can exceed 40 percent opacity, are generated by flash vaporization of hydrocarbon greases and oils. Grease and oil lubricants are being replaced by silicone emulsions and water soluble oils, which may virtually eliminate this smoke. For flat glass, the only contributor to air pollutant emissions is gas combustion in the annealing lehr (oven), which is totally enclosed except for product entry and exit openings. Since emissions are small and operational procedures are efficient, no controls are used on flat glass processes.

Table 11.15-1 (Metric And English Units). PARTICULATE, SULFUR OXIDES, AND NITROGEN OXIDES EMISSION FACTORS FOR GLASS MANUFACTURING[a]

EMISSION FACTOR RATING: B

Process	Particulate		Sulfur Oxides		Nitrogen Oxides	
	kg/Mg	lb/ton	kg/Mg	lb/ton	kg/Mg	lb/ton
Raw materials handling[b] (all types of glass)	Neg	Neg	0	0	0	0
Melting furnace[c]						
Container						
Uncontrolled	0.7	1.4	1.7	3.4	3.1	6.2
	(0.4 - 0.9)	(0.9 - 1.9)	(1.0 - 2.4)	(2.0 - 4.8)	(1.6 - 4.5)	(3.3 - 9.1)
w/low-energy scrubber[d]	0.4	0.7	0.9	1.7	3.1	6.2
w/venturi scrubber[e]	<0.1	0.1	0.1	0.2	3.1	6.2
w/baghouse[f]	Neg	Neg	1.7	3.4	3.1	6.2
w/electrostatic precipitator[g]	Neg	Neg	1.7	3.4	3.1	6.2
Flat						
Uncontrolled	1.0	2.0	1.5	3.0	4.0	8.0
	(0.4 - 1.0)	(0.8 - 3.2)	(1.1 - 1.9)	(2.2 - 3.8)	(2.8 - 5.2)	(5.6 - 10.4)
w/low-energy scrubber[d]	0.5	1.0	0.8	1.5	4.0	8.0
w/venturi scrubber[e]	Neg	Neg	0.1	0.2	4.0	8.0
w/baghouse[f]	Neg	Neg	1.5	3.0	4.0	8.0
w/electrostatic precipitator[g]	Neg	Neg	1.5	3.0	4.0	8.0
Pressed and blown						
Uncontrolled	8.4	17.4	2.8	5.6	4.3	8.5
	(0.5 - 12.6)	(1.0 - 25.1)	(0.5 - 5.4)	(1.1 - 10.9)	(0.4 - 10.0)	(0.8 - 20.0)

Table 11.15-1 (cont.).

Process	Particulate		Sulfur Oxides		Nitrogen Oxides	
	kg/Mg	lb/ton	kg/Mg	lb/ton	kg/Mg	lb/ton
w/low-energy scrubber[d]	4.2	8.4	1.3	2.7	4.3	8.5
w/venturi scrubber[e]	0.5	0.9	0.1	0.3	4.3	8.5
w/baghouse[f]	0.1	0.2	2.8	5.6	4.3	8.5
w/electrostatic precipitator[g]	0.1	0.2	2.8	5.6	4.3	8.5
Forming and finishing						
Container[h,j]	Neg	Neg	Neg	Neg	Neg	Neg
Flat	Neg	Neg	Neg	Neg	Neg	Neg
Pressed and blown[h,j]	Neg	Neg	Neg	Neg	Neg	Neg
Lead glass manufacturing, all processes[k]	ND	ND	ND	ND	ND	ND

[a] Reference 2-3,5. ND = no data. Neg = negligible. Ranges in parentheses, where available. Expressed as kg/Mg (lb/ton) of glass produced.

[b] Not separated into types of glass produced, since batch preparation is the same for all types. Particulate emissions are negligible because almost all plants utilize some form of control (i. e., baghouses, scrubbers, centrifugal collectors).

[c] Control efficiencies for the various devices are applied only to the average emission factor.

[d] Approximately 52% efficiency in reducing particulate and sulfur oxides emissions. Effect on nitrogen oxides is unknown.

[e] Approximately 95% efficiency in reducing particulate and sulfur oxide emissions. Effect on nitrogen oxides is unknown.

[f] Approximately 99% efficiency in reducing particulate emissions.

[g] Calculated using data for furnaces melting soda lime and lead glasses. No data available for borosilicate or opal glasses.

[h] Organic emissions are from decorating process. Can be controlled by incineration, absorption, or condensation, but efficiencies are not known.

[j] For container and pressed and blown glass, tin chloride, hydrated tin chloride and hydrogen chloride are also emitted during surface treatment process at a rate of <0.1 kg/Mg (0.2 lb/ton) each.

[k] References 6-7. Particulate containing 23% lead.

Table 11.15-2 (Metric And English Units). VOC, CARBON MONOXIDE, AND LEAD EMISSION FACTORS FOR GLASS MANUFACTURING[a]

EMISSION FACTOR RATING: B

Process	VOC		Carbon Monoxide		Lead	
	kg/Mg	lb/ton	kg/Mg	lb/ton	kg/Mg	lb/ton
Raw materials handling[b] (all types of glass)	0	0	0	0	ND	ND
Melting furnace[c]						
Container						
Uncontrolled	0.1	0.2	0.1	0.2	ND	ND
	(0 - 0.2)	(0 - 0.4)	(0 - 0.2)	(0 - 0.5)		
w/low-energy scrubber[d]	0.1	0.2	0.1	0.2	ND	ND
w/venturi scrubber[e]	0.1	0.2	0.1	0.2	ND	ND
w/baghouse[f]	0.1	0.2	0.1	0.2	ND	ND
w/electrostatic precipitator[g]	0.1	0.2	0.1	0.2	ND	ND
Flat						
Uncontrolled	<0.1	<0.1	<0.1	<0.1	ND	ND
w/low-energy scrubber[d]	<0.1	<0.1	<0.1	<0.1	ND	ND
w/venturi scrubber[e]	<0.1	<0.1	<0.1	<0.1	ND	ND
w/baghouse[f]	<0.1	<0.1	<0.1	<0.1	ND	ND
w/electrostatic precipitator[g]	<0.1	<0.1	<0.1	<0.1	ND	ND
Pressed and blown						
Uncontrolled	0.2	0.3	0.1	0.2	ND	ND
	(0.1 - 0.3)	(0.1 - 1.0)	(0.1 - 0.2)	(0.1 - 0.3)		

Table 11.15-2 (cont.).

Process	VOC		Carbon Monoxide		Lead	
	kg/Mg	lb/ton	kg/Mg	lb/ton	kg/Mg	lb/ton
w/low-energy scrubber[d]	0.2	0.3	0.1	0.2	ND	ND
w/venturi scrubber[e]	0.2	0.3	0.1	0.2	ND	ND
w/baghouse[f]	0.2	0.3	0.1	0.2	ND	ND
w/electrostatic precipitator[g]	0.2	0.3	0.1	0.2	ND	ND
Forming and finishing						
Container[h,j]	4.4	8.7	Neg	Neg	ND	ND
Flat	Neg	Neg	Neg	Neg	ND	ND
Pressed and blown[h,j]	4.5	9.0	Neg	Neg	ND	ND
Lead glass manufacturing, all processes[k]	ND	ND	ND	ND	2.5	5

[a] Reference 2-3,5. ND = no data. Neg = negligible. Ranges in parentheses, where available. Expressed as kg/Mg (lb/ton) of glass produced.

[b] Not separated into types of glass produced, since batch preparation is the same for all types. Particulate emissions are negligible because almost all plants utilize some form of control (i. e., baghouses, scrubbers, centrifugal collectors).

[c] Control efficiencies for the various devices are applied only to the average emission factor.

[d] Approximately 52% efficiency in reducing particulate and sulfur oxides emissions. Effect on nitrogen oxides is unknown.

[e] Approximately 95% efficiency in reducing particulate and sulfur oxide emissions. Effect on nitrogen oxides is unknown.

[f] Approximately 99% efficiency in reducing particulate emissions.

[g] Calculated using data for furnaces melting soda lime and lead glasses. No data are available for borosilicate or opal glasses.

[h] Organic emissions are from decorating process. Can be controlled by incineration, absorption or condensation, but efficiencies are not known.

[j] For container and pressed and blown glass, tin chloride, hydrated tin chloride and hydrogen chloride are also emitted during surface treatment process at a rate of <0.1 kg/Mg (0.2 lb/ton) each.

[k] References 6-7. Particulate containing 23% lead.

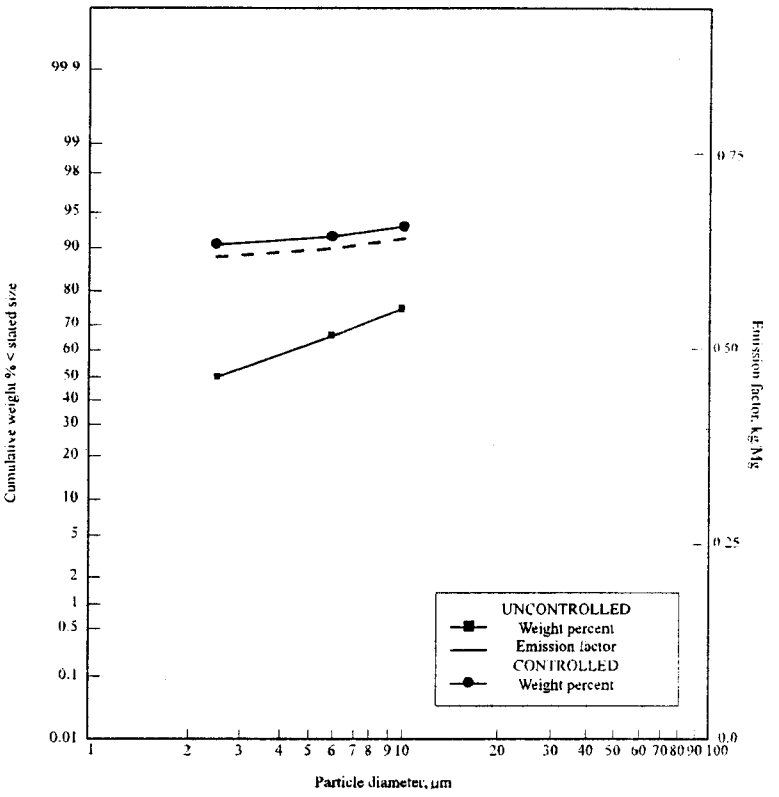

Figure 11.15-5. Particle size distributions and emission factors for glass melting furnace exhaust.

Table 11.15-3 (Metric Units). PARTICLE SIZE DISTRIBUTIONS AND EMISSION FACTORS FOR UNCONTROLLED AND CONTROLLED MELTING FURNACES IN GLASS MANUFACTURING[a]

EMISSION FACTOR RATING: E

Aerodynamic Particle Diameter, µm	Particle Size Distribution[b]		Size-Specific Emission Factor, kg/Mg[c]
	Uncontrolled	ESP Controlled[d]	Uncontrolled
2.5	91	53	0.64
6.0	93	66	0.65
10	95	75	0.66

[a] References 8-11.

[b] Cumulative weight % of particles < corresponding particle size.

[c] Based on mass particulate emission factor of 0.7 kg/Mg glass produced, from Table 11.15-1. Size-specific emission factor = mass particulate emission factor x particle size distribution, %/100. After ESP control, size-specific emission factors are negligible.

[d] References 8-9. Based on a single test.

References For Section 11.15

1. J. A. Danielson, ed., *Air Pollution Engineering Manual*, 2nd Ed., AP-40, U. S. Environmental Protection Agency, Research Triangle Park, NC, May 1973. Out of Print.

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4. A. B. Tripler, Jr. and G. R. Smithson, Jr., *A Review Of Air Pollution Problems And Control In The Ceramic Industries*, Battelle Memorial Institute, Columbus, OH, presented at the 72nd Annual Meeting of the American Ceramic Society, May 1970.

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6. *Control Techniques For Lead Air Emissions*, EPA-450/2-77-012, U. S. Environmental Protection Agency, Research Triangle Park, NC, December 1977.

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9. Emission test data from Environmental Assessment Data Systems, Fine Particle Emission Information System (FPEIS), Series Report No. 219, U. S. Environmental Protection Agency, Research Triangle Park, NC, June 1983.

10. Environmental Assessment Data Systems, *op. cit.*, Series No. 223.

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Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

Emission Source Group C - Hot End Treatment Hoods

Description: Newly formed glass containers are surface treated with an organotin compound to make them resistant to scratches and breakage. This surface coating is applied in the Forming Department while the containers move along on a conveyor passing through a specially designed hood. This hood is designed to be a closed-loop system which can deposit a thin uniform layer of a tin oxide over each container. Blower motors on the hood keep the organotin compound in constant circulation providing a coating efficiency ranging from 25 to 35 percent.

Applicable Requirements: See summary listing identified as Group C, Hot End Treatment

Specific Limitations: None

In Compliance: (yes) no

Annual Reporting Requirements:
Daily usage of M&T chemical TC100 is recorded daily by shop. Annual usage is the sum of each shops monthly report. Operating hours are obtained from the total operating days for the facility.

Emission Calculations: Particulate exhausted to ventilators

Historical average usage of TC100 is 0.13 lbs/shop.
Total facility usage = 10 x 0.13 = 1.3 lbs per operating hour
Annual operating hours = operating days x 24
Annual TC100 usage = 1.3 lbs/hour x operating hours
Coating Exhausted = TC100 usage x 0.65 = ____ lbs.
Assume 10% loss to atmosphere
Annual Emissions = ____ lbs. x 1 ton/2000 lbs. = ____ tons/year

APPLICABLE REGULATIONS AND COMPLIANCE DEMONSTRATION SUMMARY
REGULATIONS: GROUP C, HOT END TREATMENT

Regulated Pollutant	Regulatory Limits		Compliance Demnostration	Method	Enforceability
	Regulation ID	Allowable Limit or Requirement			
Opacity	PSAPCA Reg. I, §9.03	Emission of Air Contaminants: Visual Standard- it is unlawful to emit any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour which is greater than 20% opacity	Controlled rate of material application to avoid excess emissions	None	Federal
Opacity	WAC 173-400-040 (1)	Emissions cannot exceed 20% opacity for more than three total minutes in any one hour .	Reasonable precautions to prevent excess PM emissions	None	Federal

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

Emission Source Group D - Gas Fired Annealing Lehrs

Locations: Shop 41 - Coblecomex 96" wide gas
Shop 42 - Emhart 80" wide gas

Description: After the glass container is formed and treated with the tin coating, it passes through an annealing lehr. This process reduces the strains and stresses from the forming process and makes the product ready for use.

Applicable Requirements: See summary listing identified as Group D, Gas Fired Lehrs.

NOTE: General process limitations for SO_2 under PSAPCA Reg I 9.07 and WAC 173-400-040 are inapplicable for this combustion source. This is based on SO_2 not being present in natural gas from our supplier - Washington Natural Gas.

Specific Limitations: None

In Compliance: (yes) no

Annual Reporting Requirements:

Due to the relatively low consumption of natural gas in the lehrs, the lehrs are not equipped with totalizing gas meters. Therefore, in order to estimate the gas usage, we have assumed an average gas consumption per lehr of 350 CFH. Operating hours are obtained from the total operating days for the facility.

Emission Calculations:

Total annual gas usage = (350 x 2) x (337 x 24) = 5,662,000 CF

Particulate Emissions

56MMCF x 1 lbs/1 MMCF = 5.6 lbs.
5.6 lbs x 1 ton/2000 lbs = 0.003 tons/year

Grain loading calculations are shown on the following page.

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

DETERMINATION OF PARTICULATE MATTER (PM_{10}) EMISSIONS FROM COMBUSTION PROCESSES (GAS FIRED LEHRS)

1. Operating hours for 1994 gas fired combustion lehrs was 8,064.

2. Gas consumption for the two lehrs is 350 CFH x 2 or 700 CFH.

3. Emission factor for PM_{10} emissions for natural gas combustion from AP-42 Compilation was found to be 1.1 pounds per million cubic feet of gas burned.

4. The combustion reaction of natural gas can be expressed as:
   $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

5. One mole of natural gas requires 2 moles of oxygen for complete combustion. But, the volumetric concentration of oxygen in air is 21%, the rest being inert constituents (nitrogen and inert gases). Also, it is common to use about 15% excess air for gas fired combustion devices. So, the air used for combustion is about 11 moles per mole of natural gas burned. Subtracting the 2 moles of oxygen that are used up in the combustion process and adding the one mole of carbon dioxide (CO_2) formed from the combustion reaction, gives a total of 10 moles of dry exhaust gas per mole of natural gas burned. Note that the 2 moles of water vapor formed in the combustion process is not included since we are calculating the amount of dry exhaust gas. Therefore, to calculate dry exhaust gas volume for natural gas fired combustion processes, simply multiply the gas consumption (in scf) by 10.

6. Knowing the emission factor for PM_{10} emissions for natural gas combustion (Step 3 above), the mass emissions rate of PM_{10} can be calculated.
   0.000700 MMSCF/hr X 1.1 lb/MMSCF = 0.00077 lb/hr

7. The total dry exhaust gas flow rate is
   0.000700 X 10 = 0.007 MMSCF/hr

8. The conversion factor from pounds to grains is
   1 lb = 6,990 grains

9. Therefore, the concentration of PM_{10} in the exhaust gas is
   0.00077 lb/hr X 6,990 gr/lb X hr/0.007 MMSCF X MMSCF/10^6 SCF = 0.0000053 gr/dry SCF

10. To determine yearly emissions of PM_{10} multiply the hourly emissions by the number of operating hours
    0.00077 lb/hr X 8064 hr/yr = 6.20 lb/yr or 0.0031 tons/year

APPLICABLE REGULATIONS AND COMPLIANCE DEMONSTRATION SUMMARY
REGULATIONS: GROUP D, GAS FIRED LEHRS

Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Regulation ID	Allowable Limit or Requirement			
PM_{10}	PSAPCA Reg.I, §9.09(a)	Maximum PM emissions standard for fuel burning equipment: 0.05 grains/dscf (0.115 g/dscm)	Fuel usage AP42 factor	Calculation	Federal
PM_{10}	WAC 173-400-050	PM emissions limit for combustion units not burning wood-derived fuel: 0.23 g/m^3 (0.1 grains/dscf)	Compliance with PSAPCA Reg I, 9.09(a) demonstrates compliance with this regulation.		Federal
Opacity	PSAPCA Reg. I, §9.03	Emission of Air Contaminants: Visual Standard-- unlawful to emit any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour which is greater than 20% opacity	Reasonable precautions to prevent excess emissions	None	Federal
Opacity	PSAPCA Reg. I, §9.09(b) WAC 173-400-040 (1)	Emissions cannot exceed 20% opacity for more than three total minutes in any one hour	Reasonable precautions to prevent excess emissions	None	Federal

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

Emission Source Group E - Batch Handling System Dust Collectors

Notice of Construction: #1182; #4040; #1656; #2210

Description: The major raw materials of sand, soda ash, limestone, glass cullet and other minor ingredients are received by truck or rail. These materials are unloaded onto a conveyor and then transferred to storage silos by bucket elevator. The materials are individually weighed, conveyed by conveyor to a mixer and mixed thoroughly. Following the mix cycle, the batch is transferred by conveyor and bucket elevator to storage bins above the glass furnace and charged into the furnace as needed by batch chargers. See attached Batch Handling Schematic for relative locations of dust collectors and fugitive emission sources.

Seattle plant dust collector locations:

1	West side of silo	Outside	CE(7)
2	North side of silo	Outside	CE(2)
3	#1 & #3 batch conveyor		CE(13)
4	Minors material inside silo		CE(14)
5	#2 tube north end		CE(12)
6	#2 batch bin at south end of tube		CE(10)
7	#5 tube at silo		CE(11)
8	#5 tube at north end		CE(9)
9	#5 tank deck on batch screw		CE(8)
10	#1 dog house		CE(3)
11	#1 batch south end		
12	#1 packing middle of room		
13	#1 cullet incline belt		
14	Mold shop		
15	Cyclone west side of mold shop		
16	Cyclone east side of mold shop		

Applicable Requirements: See summary listing identified as Group E, Batch Handling System.

Specific Limitations: Must have an active and current operating and maintenance plan.

In Compliance: (yes) no

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

Batch Handling System Dust Collectors (Continued)

Emission Calculations:

Annual estimation for particulate emissions can be made by utilizing the number of batches handled (tons) and using an emission factor from AP-42.

The factor from AP-42 is PM_{10} from Table 8.19.1-1 Sand and Gravel processing.

Annual Emissions for 1994

216,679 tons x 0.0024 lbs/ton = 500 lbs or .025 Tons

For emission estimates on a daily basis, information quoted in Air Pollution Engineering Manual, 1992 pg. 114-115, shows that industrial usage experience from well-designed and operated baghouses are capable of reducing overall particulate emissions to less than 0.010 gr/dscf. The Seattle plant has a variety of brands and types of baghouses controlling fugitive dust from the batch handling operation and also has an active O&M plan for each of these devices. To ensure compliance with fugitive emissions our O&M plan calls for each dust collector to be physically inspected a minimum of once each month. However, our goal is to do this inspection weekly. Records showing the inspections are available in the maintenance office.

APPLICABLE REGULATIONS AND COMPLIANCE DEMONSTRATION SUMMARY
REGULATIONS: GROUP E, BATCH HANDLING SYSTEM

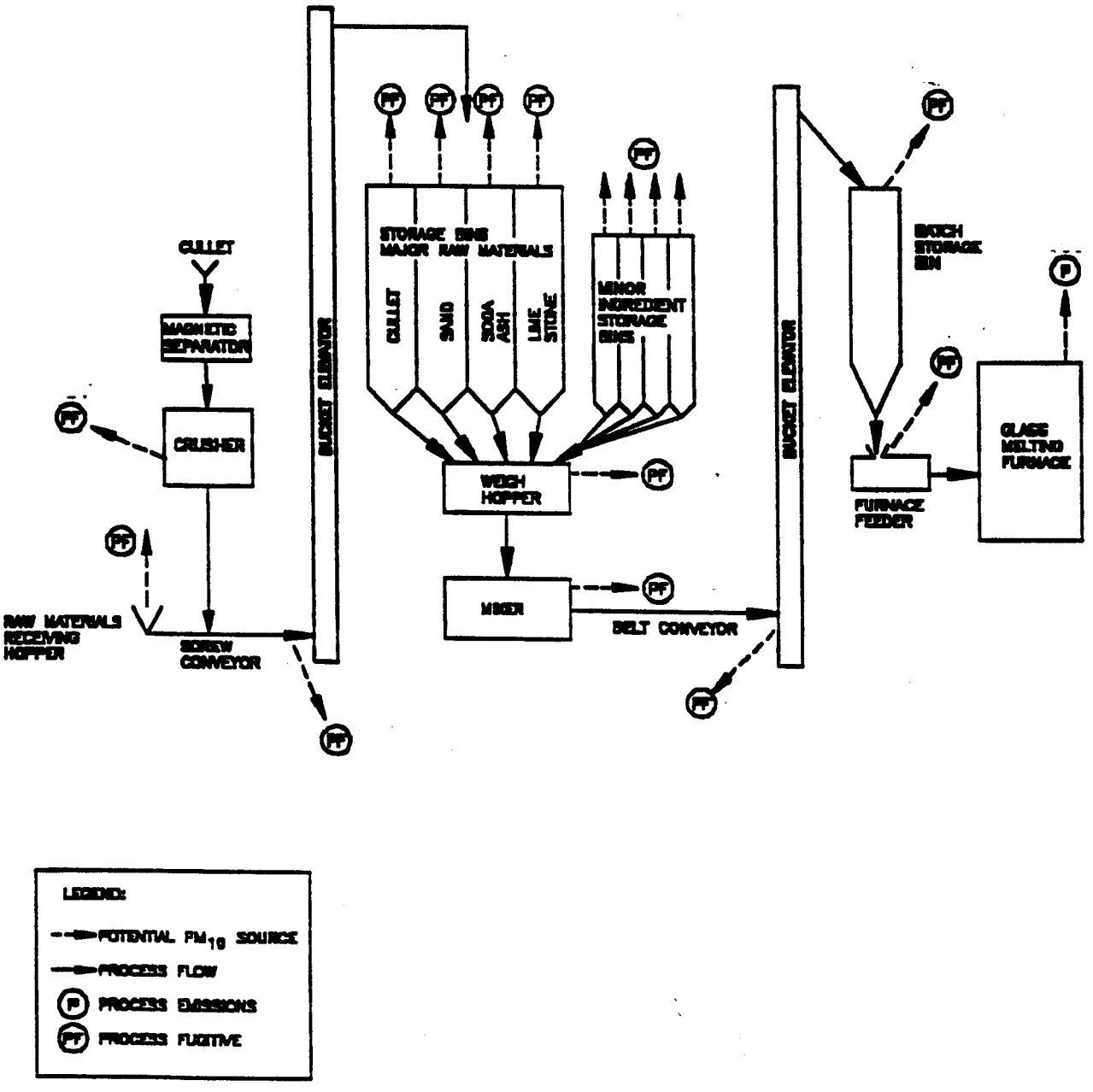
Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Regulation ID	Allowable Limit or Requirement			
PM_{10}	N.O.C. #5256 (4)	PM_{10} emissions from all baghouses ≤ 0.010 grains/dscf	well-designed and operated baghouses are capable of PM emissions <0.010 gr/dscf	O&M plan of weekly inspection	Federal
PM_{10}	PSAPCA Reg.I, §9.09(a)	PM emissions limit for Manufacturing Process Equipment: 0.05 grains/dscf	well-designed and operated baghouses are capable of PM emissions <0.010 gr/dscf	O&M plan of weekly inspection	Federal
PM_{10}	WAC 173-400-060	PM emissions limit for General Process Units: 0.23 g/m^3 (0.1 grains/dscf)	well-designed and operated baghouses are capable of PM emissions <0.010 gr/dscf	O&M plan of weekly inspection	Federal

Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Regulation ID	Allowable Limit or Requirement			
PM_{10}	WAC 173-400-040(3)(a)	Requires owner or operator of a source of fugitive emissions to take reasonable precautions to prevent the release of air contaminants from the operation	Reasonable precautions to prevent PM emission		Federal
Opacity	PSAPCA Reg. I, §9.03	Emission of Air Contaminants: Visual Standard-- unlawful to emit any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour which is greater than 20% opacity	Reasonable precautions to prevent PM emission	O&M plan of weekly inspection	Federal
Opacity	WAC 173-400-040 (1)	Emissions cannot exceed 20% opacity for more than three total minutes in any one hour .	Reasonable precautions to prevent PM emission	O&M plan of weekly inspection	Federal

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

BATCH HANDLING SYSTEM



Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

Emission Source Group F - Sulfur Treatment Process

Description: The sulfur treatment process is limited to one shop (#22) and one customer, McGaw Inc. The process involves subjecting the interior surface of the hot glass to a flammable gas and then exposing this surface to sulfur dioxide gas.

Specific Limitations: None

Applicable Requirements: See the summary regulations under the listing Group F, Sulfur Treatment Operations.

In Compliance: (yes) no

Annual Reporting Requirements: None

Emission Calculations:

Based on the limited operation of this source combined with the small usage of SO_2 gas (4-7 lbs per operating hour), plus the controlled method of application, this source generates only fugitive emissions of SO_2. These emissions as defined in WAC 173-400-030(031) are subject to no applicable requirement other than generally applicable requirements of the state implementation plan as defined in subsection (2) of regulation WAC 173-401-530.

APPLICABLE REGULATIONS AND COMPLIANCE DEMONSTRATION SUMMARY
REGULATIONS: GROUP F, SULFUR TREATMENT OPERATIONS

Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Regulation ID	Allowable Limit or Requirement			
SO_2	PSAPCA Reg.I, §9.07 WAC 173-400-040 (6)	Maximum SO_2 emission limit: 1000 ppm hourly average, dry basis	Not applicable. See note.		Federal
PM_{10}	PSAPCA Reg.I, §9.09(a)	PM emissions limit for Manufacturing Process Equipment: 0.05 grains/dscf	Not applicable. See note.		Federal
PM_{10}	WAC 173-400-060	PM emissions limit for General Process Units: 0.23 g/m^3 (0.1 grains/dscf)	Not applicable. See note.		Federal
Opacity	PSAPCA Reg. I, §9.03	Emission of Air Contaminants: Visual Standard--unlawful to emit any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour which is greater than 20% opacity	Not applicable. See note.		Federal
Opacity	PSAPCA Reg. I, §9.09(b) WAC 173-400-040 (1)	Emissions cannot exceed 20% opacity for more than three total minutes in any one hour .	Not applicable. See note.		Federal

NOTE: The emissions unit under Group F is an insignificant emissions unit under WAC 173-401-530(d). For insignificant emissions units, under WAC 173-401-530(2)(c), testing, monitoring, reporting or recordkeeping is not required, except where generally applicable requirements of the state implementation plan specifically impose these requirements.

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

Emission Source Group G - Mold Shop Operations

Notice of Construction: #4547

Description: In the glass forming process, metal moulds are used to shape the container. As bottles are made, these moulds become chipped, coated with scale and carbon and start to lose tolerance. In the process of mold repair, metalworking operations, such as grinding, machining, welding and polishing are used to restore the moulds to the required conditions and tolerances necessary for the production of quality glassware. The dust from these metalworking operations is collected by two cyclones and a high efficiency baghouse.

Specific Limitations: None

Applicable Requirements: See summary listing identified as Group G, Mold Shop Operations.

In Compliance: (yes) no

Annual Reporting Requirements: None

Calculations: From a study on materials removed from a grinding operation, the emissions are 0.1 lbs/hr.

Mold shop operates 16 hours/day 5 days/week

Annual emissions are:

0.1 lbs/hr x 16 hrs/day x 250 days/yr = 400 lbs/yr

APPLICABLE REGULATIONS AND COMPLIANCE DEMONSTRATION SUMMARY
REGULATIONS: GROUP G, MOLD SHOP OPERATIONS

Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Regulation ID	Allowable Limit or Requirement			
PM_{10}	WAC 173-400-040(3)(a)	Require owner or operator of a source of fugitive emissions to take reasonable precautions to prevent the release of air contaminants from the operation	Reasonable precautions to prevent PM emission		Federal
Opacity	PSAPCA Reg. I, §9.03	Emission of Air Contaminants: Visual Standard- it is unlawful to emit any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour which is greater than 20% opacity	Reasonable precautions to prevent PM emission		Federal
Opacity	WAC 173-400-040 (1)	Emissions cannot exceed 20% opacity for more than three total minutes in any one hour .	Reasonable precautions to prevent PM emission		Federal

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

Emission Source Group H - Styrofoam Labeling Line

Notice of Construction: #1608

Description: This operation involved the application of a pre-labeled styrofoam protective cover to the outer surface of a glass container. The bottles were called "plasti-shield" containers. The labels were cut from a roll and applied to the bottles using a little heat.

Specific Limitations: None

Applicable Requirements: See summary listing identified as Group H, Styrofoam Labeling Line.

Annual Reporting Requirements: None

Note: This operation is currently idle due to lack of business.

APPLICABLE REGULATIONS AND COMPLIANCE DEMONSTRATION SUMMARY
REGULATIONS: GROUP H, STYROFOAM LABELING LINE

Regulated Pollutant	Regulatory Limits		Compliance Demonstration	Method	Enforceability
	Regulation ID	Allowable Limit or Requirement			
Opacity	PSAPCA Reg. I, §9.03	Emission of Air Contaminants: Visual Standard- it is unlawful to emit any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour which is greater than 20% opacity	Reasonable precautions to prevent excess PM emissions	None	Federal
Opacity	WAC 173-400-040 (1)	Emissions cannot exceed 20% opacity for more than three total minutes in any one hour .	Reasonable precautions to prevent excess PM emissions	None	Federal

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

INSIGNIFICANT EMISSION UNITS

In addition to the major process groups, the Seattle facility has the following activities and emission units (one or several) which are considered insignificant sources.

- Small gas fired space heaters
- Vacuum pumps
- Brazing, soldering and welding equipment and cutting torch
- Comfort air-conditioning units
- Ovens for heating metal mold for glass manufacturing
- Trackmobile
- Propane fueled lift trucks
- Standy IC engine for emergency power
- Cyclone dust collector for forming equipment cleaning (PSAPCA exempt NOC #5542)

BALL GLASS CONTAINER CORPORATION

EMISSIONS SUMMARY TABLE

SOURCE	PARTICULATE			CO			NOX			SO2			VOC		
	LB/HR	LB/DAY	TONS/YR	LB/HR	LB/DAY	TONS/YR	LB/HR	LB/DAY	TONS/YR	LB/HR	LB/DAY	TONS/YR	LB/HR	LB/DAY	TONS/YR
FURNACE #2	2.84	68.1	12.48	0.004	0.1	0.02	6.8	163.3	27.51	6.94	166.6	28.08	1.4	33.6	5.67
FURNACE #3	4.3	103.2	18.85	0.007	0.1	0.03	5.63	135.3	24.7	4.97	119.3	21.78	1.48	35.6	6.5
FURNACE #4	4.2	100.8	18.2	0.004	0.1	0.02	77.53	1788.8	313.95	3.8	91.3	16.03	1.02	24.6	4.33
FURNACE #5	2.55	61.2	10.93	0.005	0.1	0.02	4.55	109.2	17.82	8.99	215.8	35.17	1.21	29.1	4.75
FORMING MACHINES	4.1	98.4	16.5	0	0	0	0	0	0	0	0	0	0	0	0
HOT END TREAT	0.13	3.1	0.3	0	0	0	0	0	0	0	0	0	0	0	0
GAS LEHRS	NEG	NEG	0.003	NEG	NEG	NEG	0.09	2.1	0.4	0	0	0	0	0	0
BATCH HANDLING	0.05	1.3	0.25	0	0	0	0	0	0	0	0	0	0	0	0
MOLD SHOP	0.1	2.4	0.2	0	0	0	0	0	0	0	0	0	0	0	0
SULFUR TREATMENT	NEG	NEG	N/A	0	0	0	0	0	0				0	0	0
TOTALS	XXX	XXX	77.91	XXX	XXX	0.09	XXX	XXX	384.5	XXX	XXX	101.1	XXX	XXX	21.25

BALL GLASS CONTAINER CORPORATION

EMISSION INVENTORY–GLASS FURNACES

PARTICULATE MATTER (PM10)

SOURCE	CONTROL DEVICE	SOURCE TYPE	RATED CAPACITY (T/D)	ANNUAL PROD (TONS)	OPERATING HOURS (HRS/DAY)	OPERATING DAYS (DAYS/YR)	STACK DIAM (INCHES)	GRAIN LOADING (GR/SCF)	EMISSION RATE (LBS/HR)	STACK TEMP (F)	PROD RATE (T/HR)	EMISSION FACTOR	
												LBS/TON	DATE
FURNACE #2	NONE	POINT	195	56728	24	337	29.25	0.029	2.63	536	6.02	0.44	5/17/94
FURNACE #3	NONE	POINT	205	65022	24	365	48.50	0.022	4.05	324	6.95	0.58	5/18/94
FURNACE #4	NONE	POINT	165	43334	24	351	40.25	0.080	4.63	393	5.47	0.85	5/19/94
FURNACE #5	NONE	POINT	205	47538	24	326	41.50	0.026	2.53	432	5.44	0.46	5/20/94

EMISSION CALCULATIONS:

SOURCE	ACTUAL EMISSIONS				ALLOWABLE EMISSIONS			
	LBS/HR	LBS/DAY	TONS/YR	BASIS	LBS/HR	LBS/DAY	TONS/YR	BASIS
FURNACE #2	2.84	68.1	12.48	D	3.0	72.0	13.14	A
FURNACE #3	4.30	103.2	18.85	D	7.0	168.0	30.66	A
FURNACE #4	4.20	100.8	18.20	D	4.7	112.8	20.58	A
FURNACE #5	2.55	61.2	10.93	D	2.8	67.2	12.26	A
TOTALS	13.89	333.3	60.46		17.5	420.0	76.64	

BASIS A: EMISSION LIMITATIONS – PSAPCA PERMIT

BASIS B: PROCESS LIMITATIONS

BASIS C: LIMITATIONS ON HOURS OF OPERATION

BASIS D: HRS/YR, EQUIPMENT RATED CAPACITY, NO LIMITATIONS

BASIS E: ACTURAL GRAIN LOADINGS AND HOURS OF OPERATION

ABC FEDERALLY ENFORCEABLE PERMIT LIMITATION

BALL GLASS CONTAINER CORPORATION

EMISSION INVENTORY - GLASS FURNACES

PARTICULATE MATTER (PM10)

SOURCE	CONTROL DEVICE	SOURCE TYPE	RATED CAPACITY (T/D)	MATERIAL USAGE	OPERATING HOURS (HRS/DAY)	OPERATING DAYS (DAYS/YR)	STACK DIAM (INCHES)	GRAIN LOADING (GR/SCF)	EMISSION RATE (LBS/HR)	STACK TEMP (F)	PROD RATE (T/HR)	EMISSION FACTOR #	EMISSION FACTOR UNITS
FORMING MACHINE	NONE	FUGITIVE	N/A	42,950 LB	24	337	N/A	N/A	4.1	75	N/A	-	-
H. E. TREAT	NONE	FUGITIVE	N/A	10,514 LB	24	337	N/A	N/A	0.13	75	N/A	1.3	LBS/OP HR
GAS LEHRS	NONE	FUGITIVE	N/A	700 CFH	24	337	N/A	N/A	NEG	75	N/A	1.1	LB/MMCF
BATCH HANDLING	BAGHOUSE	FUGITIVE	N/A	216,679 T	24	365	N/A	N/A	0.05	AMBIENT	N/A	0.024	LB/TON
MOLD SHOP	BAGHOUSE	POINT	N/A	N/A	24	337	30	N/A	0.1	75	N/A	-	-
SULFUR TREAT	NONE	FUGITIVE	N/A	N/A	24	56	N/A	N/A	NEG	75	N/A	-	-
STYROFOAM LINE	NONE	FUGITIVE	N/A	N/A	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A

EMISSION CALCULATIONS:

SOURCE	ACTUAL EMISSIONS LBS/HR	LBS/DAY	TONS/YR	BASIS	ALLOWABLE EMISSIONS LBS/HR	LBS/DAY	TONS/YR	BASIS
FORMING MACHINE	4.1	98.4	16.5	D	-	-	-	
H. E. TREAT	0.13	3.1	0.3	D	-	-	-	
GAS LEHRS	NEG	NEG	0.003	D	-	-	-	
BATCH HANDLING	0.05	1.3	0.25	D	-	-	-	
MOLD SHOP	0.1	2.4	0.2	D	-	-	-	
SULFUR TREAT	NEG	NEG	NEG	D	-	-	-	
STYROFOAM LINE	0	0	0	D	-	-	-	
TOTALS	XXX	XXX	17.25		-	-	-	

BASIS A: EMISSION LIMITATIONS - PSAPCA PERMIT

BASIS B: PROCESS LIMITATIONS

BASIS C: LIMITATIONS ON HOURS OF OPERATION

BASIS D: HRS/YR, EQUIPMENT RATED CAPACITY, NO LIMITATIONS

BASIS E: ACTURAL GRAIN LOADINGS AND HOURS OF OPERATION

ABC FEDERALLY ENFORCEABLE PERMIT LIMITATION

PSAPCA REG 11656
Revision FINAL
Date:June 3, 1995

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

PERMIT SHIELD REQUEST

Pursuant to the provision of Title V of the Clean Air Act Amendments, the Seattle plant of Ball Glass Container Corp. hereby requests from Puget Sound Air Pollution Control Agency (PSAPCA) an application shield as of June 7, 1995. It is our understanding that all terms and conditions under existing PSAPCA permits will continue in effect until the issuance of the Title V permit.

By: _____
Authorized Signature

Plant Manager
Title of Signatory

Frank W. Glinka
Typed or Printed Name of Signatory

6-6-95
Date of Signature

PSAPCA REG 11656
Revision FINAL
Date:June 3, 1995

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

COMPLIANCE CERTIFICATION

As a duly authorized official in charge of the Seattle plant of Ball Glass Container Corp., I hereby certify under penalty of law that, based on information and belief formed after reasonable inquiry, the statements and information contained in this application are true, accurate and complete.

Authorized Signature:

By: _____
Authorized Signature

Plant Manager
Title of Signatory

Frank W. Glinka
Typed or Printed Name of Signatory

6-6-95
Date of Signature

Puget Sound Air Pollution Control Agency

FACILITY PERMIT TO OPERATE
BALL GLASS CONTAINER CORPORATION

APPENDIX A

INAPPLICABLE REGULATIONS

INAPPLICABLE REGULATIONS

Regulated Pollutant	Regulatory Limits		Reason for Inapplicability	Notes
	Regulation ID	Allowable Limit or Requirement		
General	PSAPCA Reg. I, §4.01 and §4.03	May apply for variance from rules and regulations. Filing fee of $1,000 to be paid to Agency upon filing variance application.	Not applicable unless triggered.	
General	PSAPCA Reg. I, §5.02	Definition and Components of Registration Program	Citation is procedural.	
General	PSAPCA Reg. I, §5.03	Registration Required	Citation is procedural.	
General	PSAPCA Reg. I, §5.05	General Requirements for Registration	Citation is procedural.	
General	PSAPCA Reg. I, §5.08	May remove from registration, upon request, a registered, shut down source. Source may not be operated thereafter unless a Notice of Construction is submitted for approval with the Agency.	Not applicable unless triggered.	
General	PSAPCA Reg. I, §6.03	Notice of Construction	Not applicable unless triggered.	

Regulated Pollutant	Regulatory Limits		Reason for Inapplicability	Notes
	Regulation ID	Allowable Limit or Requirement		
General	PSAPCA Reg. I, §6.04	"Notice of Construction" and "Application for Approval" are not complete until receives a plan examination fee.	Not applicable unless triggered.	
General	PSAPCA Reg. I, §6.06	Public Notice	Not applicable unless triggered.	
General	PSAPCA Reg. I, §6.07	Order of Approval-Order to Prevent Construction	Not applicable unless triggered.	
General	PSAPCA Reg. I, §6.09	Notice of Completion	Not applicable unless triggered.	
General	PSAPCA Reg. I, §6.10	Work Done Without an Approval	Not applicable unless triggered.	
General	WAC 173-400-110	New Source Review	Not applicable unless triggered.	
General	WAC 173-400-114	Requirements for Replacement or Substantial Alteration of Emission Control Technology at an Existing Stationary Source	Not applicable unless triggered.	
General	WAC 173-400-120	Bubble Rules	Not applicable unless triggered.	

Regulated Pollutant	Regulatory Limits		Reason for Inapplicability	Notes
	Regulation ID	Allowable Limit or Requirement		
General	WAC 173-400-131	Issuance of Emission Reduction	Not applicable unless triggered.	
General	WAC 173-400-136	Use of Emission Reduction Credits	Not applicable unless triggered.	
General	WAC 173-400-151	Visibility Protection	Not applicable unless triggered.	
General	WAC Ch. 173-460	New Source Review for Air Toxics	Not applicable unless triggered.	
General	40 CFR 52.21(b)-(w)	Prevention of Significant Deterioration (PSD) Rules	Not applicable unless triggered.	
All	PSAPCA Reg. I, §11	Ambient Air Standards	Not applicable as per Guidelines For Preparing Air Operating Permit Application, Compiled by Department of Ecology and the Aluminum/Magnesium Industry, Pg. 9, Dec. '94.	
PM_{10}	40CFR Part 60, Subpart CC WAC 173-400-115	PM_{10} emissions limit for glass-melting furnaces producing container glass: 0.5 g/kg glass produced (modified process)	Not applicable unless triggered.	

Regulated Pollutant	Regulatory Limits		Reason for Inapplicability	Notes
	Regulation ID	Allowable Limit or Requirement		
TAC	PSAPCA Reg. III, §1.11(b)	Upon request of the Agency, provide information as necessary to assist the Agency to determine if the emissions of TACs from the source may result in the exceedence of an ASIL contained in Appendix A of Regulation III.	Not applicable unless triggered.	
NO_x	WAC 173-400-030(3)	0.050 ppm	Regulatory citation is a definition and does not impose an emission standard.	